

Project:

Jordberga\_rickard

Licensed user:

BayWa r.e. Scandinavia AB

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Calculated:

2019-11-14 14:35/3.2.669

## SHADOW - Main Result

Calculation: 160119

### Assumptions for shadow calculations

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Please look in WTG table

Minimum sun height over horizon for influence 3 °

Day step for calculation 1 days

Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [LUND]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,72	1,80	3,22	6,40	9,28	8,04	7,22	5,93	4,57	3,22	1,98	1,28

Operational hours are calculated from WTGs in calculation and wind distribution:

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Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
340	308	493	727	709	541	574	807	1 164	1 370	1 002	515	8 550

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Height Contours: CONTOURLINE\_ONLINEDATA\_0.wpo

Obstacles used in calculation

Eye height for map: 1,5 m

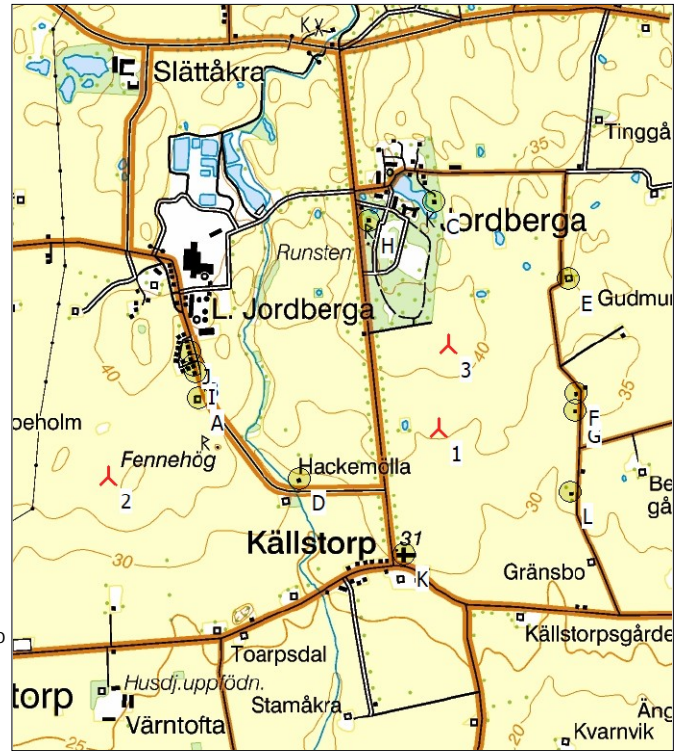
Grid resolution: 10,0 m

All coordinates are in

SWE99TM

### WTGs

No.	X(East)	Y(North)	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	399 858	6 140 954	35,5	VESTAS V126-3.3 GridS...	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	86,0	1 722	12,8
2	398 108	6 140 704	33,9	VESTAS V126-3.3 GridS...	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	86,0	1 722	12,8
3	399 908	6 141 400	40,0	VESTAS V126-3.3 GridS...	Yes	VESTAS	V126-3.3 GridStreame-3 300	3 300	126,0	86,0	1 722	12,8



Scale 1:40 000

New WTG

Shadow receptor

### Shadow receptor-Input

No.	X(East)	Y(North)	Z	Width [m]	Height [m]	Elevation a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
A	398 587	6 141 116	37,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
B	398 563	6 141 290	38,8	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
C	399 828	6 142 156	39,6	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
D	399 117	6 140 691	30,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
E	400 540	6 141 748	35,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
F	400 584	6 141 144	35,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
G	400 577	6 141 054	34,1	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
H	399 485	6 142 053	40,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
I	398 570	6 141 254	38,7	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
J	398 541	6 141 360	39,3	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
K	399 671	6 140 293	30,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0
L	400 551	6 140 620	30,0	5,0	5,0	2,0	0,0	0,0	"Green house mode"	2,0

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## SHADOW - Main Result

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### Calculation Results

Shadow receptor

No.	Shadow, worst case		Shadow, expected values	
	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
A	57:36	133	0:49	10:03
B	64:20	135	0:44	9:46
C	2:22	14	0:13	0:13
D	47:31	110	0:40	15:04
E	57:02	131	0:42	8:56
F	65:04	130	0:43	18:00
G	82:36	153	0:42	23:20
H	49:06	80	0:42	5:39
I	65:34	143	0:45	10:10
J	52:10	117	0:42	7:41
K	3:19	20	0:16	0:55
L	52:18	106	0:41	16:09

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name		Worst case [h/year]	Expected [h/year]
1	VESTAS V126-3.3 GridStreame	3300 126.0 !O! hub: 86,0 m (TOT: 149,0 m) (55)	173:10	44:19
2	VESTAS V126-3.3 GridStreame	3300 126.0 !O! hub: 86,0 m (TOT: 149,0 m) (56)	139:27	21:27
3	VESTAS V126-3.3 GridStreame	3300 126.0 !O! hub: 86,0 m (TOT: 149,0 m) (57)	184:49	42:37

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.